ALGEBRA SET

1. If $x = \sqrt[4]{x^3 + 6x^2}$, then the sum of all possible solutions for x is:

A. -2
B. 0
C. 1
D. 3
E. 5

2. The equation x^2 + ax - b = 0 has equal roots, and one of the roots of the equation x^2 + ax + 15 = 0 is 3. What is the value of b?

A. -64
B. -16
C. -15
D. -1/16
E. -1/64

3. If a and b are positive numbers, such that a^2 + b^2 = m and a^2 - b^2 = n, then ab in terms of m and n equals to:

A. $\dfrac{\sqrt{m-n}}{2}$

B. $\dfrac{\sqrt{mn}}{2}$

C. $\dfrac{\sqrt{m^2 - n^2}}{2}$

D. $\dfrac{\sqrt{n^2 - m^2}}{2}$

E. $\dfrac{\sqrt{m^2 + n^2}}{2}$

4. What is the maximum value of -3x^2 + 12x -2y^2 - 12y - 39 ?

A. -39
B. -9
C. 0
D. 9
E. 39

5. If x^2 + 2x -15 = -m, where x is an integer from -10 and 10, inclusive, what is the probability that m is greater than zero?

A. 2/7
B. 1/3
C. 7/20
D. 2/5
E. 3/7

6. If mn does not equal to zero, and m^2n^2 + mn = 12, then m could be:

I. -4/n
II. 2/n
III. 3/n

A. I only
B. II only
C. III only
D. I and II only
E. I and III only

7. If x^4 = 29x^2 - 100, then which of the following is NOT a product of three possible values of x?

I. -50
II. 25
III. 50

A. I only
B. II only
C. III only
D. I and II only
E. I and III only

8. If m is a negative integer and m^3 + 380 = 381m , then what is the value of m?

A. -21
B. -20
C. -19
D. -1
E. None of the above

9. If $x = \left(\sqrt{5} - \sqrt{7}\right)^2$, then the best approximation of x is:

A. 0
B. 1
C. 2
D. 3
E. 4

10. If f(x) = 2x - 1 and g(x) = x^2, then what is the product of all values of n for which f(n^2)=g(n+12) ?

A. -145
B. -24
C. 24
D. 145
E. None of the above